The Comparison of High-Intensity Interval Exercise vs. Continuous Moderate-Intensity Exercise on C1q/TNF-Related Protein-9 Expression and Flow-Mediated Vasodilation in Obese Individuals

[1,2] BRANDON G. FICO, [3] RYAN S. GARTEN, [1] MICHAEL C. ZOURDOS, [1] MICHAEL WHITEHURST, [1] PETER J. FERRANDI, [1] KATELYN M. DODGE, [1] GABRIEL PENA, [1] ALEXANDRA A. RODRIGUEZ, and [1] CHUN-JUNG HUANG

[1] Exercise Biochemistry Laboratory; Department of Exercise Science and Health Promotion; Florida Atlantic University, FL
[2] Cardiovascular Aging Research Laboratory; Department of Kinesiology and Health Education; University of Texas at Austin, TX
[3] Department of Kinesiology and Health Sciences; Virginia Commonwealth University, VA

Category: Masters

Advisor / Mentor: Huang, Chun-Jung (chunag5@fau.edu)

ABSTRACT

PURPOSE: A recent novel adipocytokine, C1q/TNF-related protein-9 (CTRP9), has been shown to increase activation of endothelial nitric oxide synthase and reduce vasoconstrictors (e.g., endothelin-1). In addition, CTRP9 may play a compensatory role in obesity-related endothelial dysfunction. Although there is limited information regarding exercise-mediated CTRP9, high-intensity interval exercise (HIIE) has been shown to be as or more effective than continuous moderate-intensity exercise (CME) in improving indicators of endothelial function (e.g., brachial artery flow-mediated dilation [BAFMD]). Therefore, the purpose of this study was to investigate the effect of acute HIIE vs. CME on serum CTRP9 and BAFMD responses in obese individuals. **METHODS:** Sixteen young male subjects (9 obese and 7 normal-weight) participated in a counterbalanced and caloric equated experiment: HIIE (30 minutes, 4 intervals of 4 minutes at 80-90% of VO_{2max} with 3 minutes rest between intervals) and CME (38 minutes at 50-60% VO_{2max}). Serum CTRP9 and BAFMD, were measured prior to, immediately following exercise, and 1 hour and 2 hours into recovery. **RESULTS:** The concentration of serum CTRP9 was significantly increased immediately following acute HIIE and CME in both obese and normal-weight groups ($p = 0.003$). Furthermore, both significant treatment by time and group by time interactions for BAFMD were observed following both exercise protocols ($p = 0.018$; $p = 0.009$; respectively), with a greater CME-induced BAFMD response at 2 hours into recovery in obese compared to normal-weight subjects. Additionally, a positive correlation in percent change (baseline to peak value) between CTRP9 and BAFMD was found following acute CME ($r = 0.589$, $p = 0.016$). **CONCLUSIONS:** Acute HIIE is as effective as CME to upregulate CTRP9 expression in both obese and normal-weight individuals, although CTRP9 may potentially improve CME-mediated BAFMD. The novel results from this study provide a foundation for additional examination of the mechanisms of exercise-mediated CTRP9 on endothelial function.